A new light for mass-market programs

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ABSTRACT

Residential lighting is disappearing from efficiency programs nationwide, creating challenges for Program Administrators who have relied on it for major savings. Consolidated Edison (Con Edison), which serves 3.6 million New Yorkers, saw an opportunity to build on the success of its retailer partnership process gained through its lighting programs to incentivize self-install products at the point of purchase.

Initiatives of this nature introduce savings uncertainties that can erode anticipated achievements, including leakage of subsidized products outside the intended territory and low installation rates. In addition, mass market programs can move do-it-yourself products rapidly; waiting a year or more to study them leaves little time to correct savings parameter placeholder or delivery, jeopardizing achievement of savings goals. To overcome these risks, Con Edison took a high-rigor primary data collection approach to determine key savings parameters with high confidence.

The two primary data collection methods used to establish key savings parameters were:

1. Intercepts performed with customers purchasing program-supported products at participating stores.
2. A web survey with customers who purchased at least one program measure.

Paramount to this study's success was its design as a "rolling" evaluation (e.g., an evaluation that produced results for review throughout performance) that provided real-time results. Sharing study findings as they became available enabled any needed claimed savings adjustments and to ensure final study outcomes were understood prior to study reporting. This study also included a robust secondary research effort to benchmark for reasonableness primary data collection results against results from other publicly available sources.

Background and Introduction

Residential lighting is disappearing from efficiency programs nationwide, creating a significant challenge for Program Administrators who have relied on it as a major contributor to portfolio electric savings goals. As noted in the latest ACEEE state scorecard (ACEEE 2025), this shift away from lighting is largely due to changing federal baselines and growing market share of LED lamps. Concurrently, many states like New York have established ambitious goals to cut greenhouse gas emissions and adopted higher state-level energy efficient appliance standards, adding further pressure and challenges to achieving substantial electric and fossil fuel energy savings through program efforts. Under these conditions, Con Edison identified an opportunity to incentivize self-install efficiency products at the point of purchase. In June 2023, Con Edison began a Retail Products Program offering instant discounts for a wide variety of electric and non-electric (fossil fuel) energy efficient products at large retailers in their territory.

Mid-stream initiatives of this nature are appealing for many reasons. The point of purchase discount lowers the cost barrier to efficiency upgrades through existing market channels, all with low

administrative costs. However, this model also introduces savings uncertainties that can substantially erode anticipated achievements, including leakage of subsidized products outside of the intended territory and low, do-it-yourself installation rates. Magnifying this risk, mass-market programs can move products rapidly and waiting a year or more to study them leaves little time to correct savings parameters or delivery, potentially jeopardizing achievement of savings goals. To mitigate these risks, Con Edison used a high-rigor two-prong primary data collection approach to confidently determine installation rates, space and hot water fuel saturation, and product leakage. These parameters were critical to the study as they are the key parameters to understanding product level electric and gas impacts. Electric and gas impacts were both of interest in the context of carbon emissions reduction goals in New York state. Due to the importance of this initiative and swift-moving activity, regular meetings with Con Edison implementation and program staff were conducted to vet any findings from the study activities and make any savings adjustments as deemed necessary or clarify actions made with the study team.

Table 1 shows the diverse range of measures discounted in program activity from June 2023 to July 2024. Discounted products included weatherization, air sealing, appliances, domestic hot water (DHW) measures such as aerators, pipe insulation, and other measures such as thermostats. Note that some measures were discontinued in 2024 due to regulatory changes or program adjustments to focus further on weatherization and air sealing measures. Spray foam insulation, caulk, and pipe wrap represented the largest share of program activity during this period.

Table 1. Discounted measures from June 2023 to June 2024.

 **Air Sealing/Weatherization**	 **Appliances**	 **DHW/Other**
AC Covers	Air Purifiers*	Advanced Power Strips*
Batt Insulation	Dehumidifiers*	Pipe Wrap
Caulk - Air-Sealing	Induction cooktops*	Showerheads*
Door Sweeps		Smart Thermostats*
Exterior Doors		
Spray Foam Insulation		
Weatherstripping		
Window Shrink Kits		
Windows		

*Measures discontinued from the program in 2024.

The overarching goal of the study was to produce a Verified Gross Savings estimate of the Retail Program impact from June 2023 through June 2024. Tracking system review, New York State TRM compliance, review of secondary data, and primary data collection were central to the effort. The study had several objectives, with two of particular importance to this paper. They were:

- **Objective 1**: Establish a rolling embedded evaluation that shared study feedback on an ongoing basis throughout the study period through regular check-ins with evaluation staff to address inconsistencies as they arose and key impact findings as they were discovered.
- **Objective 2:** Determine program delivery factors that may influence reported program savings. Similar programs in other jurisdictions were reviewed to gather non-TRM based assumptions such

as in-service rates (ISRs), percent fuel distribution for weatherization and domestic hot water measures, and leakage rates.

Study Methods

Three key activities informed the objectives above. These activities were performed over four months. They were (1) establishing a rapid feedback system throughout the project, (2) reviewing key savings input results from studies of similar programs, and (3) performing primary research including intercept and previous participant surveys. The key activities are further described below.

- **Rapid feedback system.** A set of weekly calls and task and interim deliverable milestones were established to facilitate the sharing of findings and their savings implications in near-real-time. This system included interim PowerPoint presentations and memos to fully document study progress, observations, and ongoing revision of savings impacts based upon that progress.
- **Review of similar programs:** A literature review of other utility retailer programs and Technical Reference Manuals (TRMs) was performed to benchmark ISRs and fuel saturation rates. This review included evaluation material, and other data provided by Con Edison for assumed measure installation rates, space and DHW fuel saturation rates, leakage, and findings related to residential versus commercial application of measures like those offered through the Retail Products Program.
- **Primary data collection:** The study included store intercepts with product purchasers at the point of sale as well as web surveys with previous participants. Each effort had its own advantages and disadvantages and was undertaken concurrently to ensure reporting on results.

    - The first primary data collection effort included 118 intercepts at 9 stores. These store intercepts gathered information on planned product-level installation rates, leakage, and application in residential or commercial settings. Participating customers were offered a gift card redeemable at the store the intercept was performed at, to encourage customers to respond to the brief survey.

    - The second primary data collection was a generic customer web survey performed by Con Edison with 299 respondents that reported purchasing 1,393 discounted products through the program. Respondents were identified as participants based on location and price of recently purchased products. The survey questions were developed to explore the use of caulk for air sealing or painting or waterproofing applications.

Results

This project was an important part of Con Edison's planned 2024 studies. The results from this study were used to revise Consolidated Edison's placeholder values to produce final estimated savings claims (Verified Gross Savings) by product type for filing purposes. Many subsequent and concurrent activities that were critical to the studies' success needed to happen in a short period of time. Study planning included a firm commitment to a rolling evaluation approach. The goal of this study feature was to have a set of results driven by full transparency of activities and findings throughout. The approach taken was very successful and is summarized in Figure 1.

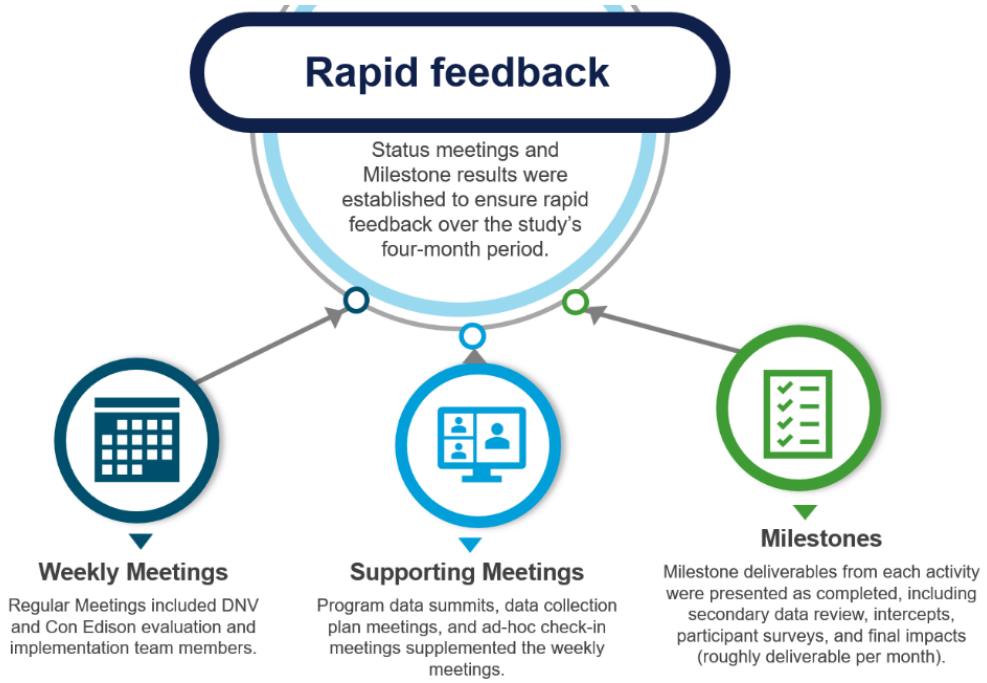

Figure 1. Rolling rapid feedback approach

Secondary Research Results

Secondary research was performed as a preliminary step to understand savings assumptions around installation rates and fuel saturations (% fuel distribution) by other utilities and data sources. Installation rate assumptions reduce the number of units discounted (sold) that receive program savings, while fuel saturations impact the type of fuel savings credited for products that impact space or hot water systems.

Installation Rates

Table 2 compares the installation rate (ISR) ranges found in the secondary literature review (from the MA and IL TRMs and the NYSEG and RG&E Retail Products Program 2022 PY Report). No ISR data was found in the secondary literature review for three measures (AC covers, windows, and exterior doors).

Table 2. Secondary data ISR results

Program Measure	Con Edison Placeholder Values	Secondary Source Assumption Range (# of sources)
AC Covers	50.0%	No data available
Batt Insulation	50.0%	99%-100% (1)
Caulk – Air Sealing	35.0%	60%-100% (2)
Door Sweeps	50.0%	68%-100% (3)
Exterior Doors	100.0%	No data available
Pipe Wrap	50.0%	100% (1)
Spray Foam Insulation	50.0%	69%-100% (3)
Weatherstripping	50.0%	69%-100% (2)
Window Shrink Kits	67.0%	69%-100% (2)
Windows	100.0%	No data available

Space Heating Fuel Saturations

Table 3 shows the electric and gas space heating saturation results found in the secondary literature review for comparison to Con Edison's placeholder values. Con Edison had fuel saturation placeholders to estimate electric and gas savings for relevant products. The electric space heating fuel saturation estimate was 25%, which is higher than all secondary sources. Con Edison's gas space heating placeholder of 75% is near the middle of those observed in the secondary source results. Oil represents most of the remaining saturation of space heating fuel where the total electric and gas saturations do not equal 100%.

Table 3. Secondary data space heating fuel saturation

Source	Electric	Gas
NYSERDA 2019 Building Stock Assessment of SF Homes in Climate Zone 4 (covering NYC, Long Island, and Westchester County)	4%	67%
Based on 2019 energy consumption estimates for residential buildings in CECONY territory by fuel and by use case. EPRI. Assessment of building electrification technologies in New York State. 2023.	8%	63%
NYCPLUTO database HR&A analysis of Low-to-Moderate-Income (LMI) customers	11%	83%
NYCPLUTO database HR&A analysis of non-Low-to-Moderate-Income customers	12%	82%
NYSERDA 2019 Building Stock Assessment. Combined value for NYC & Westchester County of occupied housing units by type of space heating fuel (Single Family Building Assessment 2019)	12%	66%
Central Hudson (NY) 2018 Residential Appliance Saturation Survey (Residential Appliance Saturation Survey Results 2018)	12%	25%
2020 New York State RECS data/EIA website (EIA)	16%	61%

Water Heating Fuel Saturations

Table 4 compares the DHW heating saturation results found in the secondary literature review to Con Edison's placeholder prior to the study. Four secondary data points were used in this table, two from

New York and two from outside of New York. Oil and propane represent most of the remaining saturation of space heating fuels. The DHW electric fuel program placeholder used by Con Edison was lower than the NY based sources and within non-NY based sources. While Con Edison's placeholders are outside of the bounds of the NY statewide secondary source results, they are within the non-NY results from the secondary literature review.

Table 4. Secondary literature review DHW heating saturation results compared to Con Edison placeholders.

Fuel	Con Edison Placeholder	Secondary Literature Review (# of sources)
Electric	25%	28%–31% NY-specific (2), 24%–36% Non-NY (2)
Natural Gas	75%	27%–57% NY-specific (2), 55%–76% Non-NY (2)

Primary Research Results

Installation rates were calculated from the intercept and web survey results separately. After examining measure-level results from each effort, the web survey results were used in the final verified gross savings impact estimate. Although not shown, the two sets of results were more similar than dissimilar as Installation rates from both efforts ranged from 57% to 100%, with most products falling between 60-80%.

The web survey installation rate results were used over the intercept results in the study performed for three reasons:

- First, the web survey results were based on more responses.
- Second, they offered more conservative numbers with good precisions, and
- Third, they reflected actual customer-reported installations, as opposed to customer-reported plans for installation (which is the basis for the intercept results).

Table 5 compares the web-based measure level installation rates to the placeholders used by Con Edison. Precisions at the 90% confidence level are provided for each measure-level installation rate. All final study installation rates were statistically different from Con Edison's placeholders except for batt insulation and caulk – air sealing. Note that most of the evaluation installation rates were either lower than or amid those observed in the secondary literature review. This suggests the study installation rate values are generally more conservative than those assumed elsewhere.

Table 5. Applied installation rates compared to Con Edison placeholder and secondary results

2024 Measure	Evaluation Installation Rate	Precision at 90% Confidence Level	Con Edison Placeholder	Secondary Literature Review (# of sources)
AC Covers	60.8%^	±6.7%	50.0%	No data available
Batt Insulation	70.0%*	±33.7%	50.0%	99%-100% (1)
Caulk – Air Sealing	33.9%*	±3.6%	35.0%	60%-100% (2)
Door Sweeps	58.6%^	±7.4%	50.0%	68%-100% (3)
Pipe Wrap	86.2%^	±6.3%	50.0%	100% (1)
Spray Foam Cans	78.5%^	±4.9%	50.0%	69%-100% (3)
Weatherstripping	57.7%^	±3.8%	50.0%	69%-100% (2)
Window Shrink Kits	75.8%^	±7.1%	67.0%	69%-100% (2)
Windows	74.4%^	±7.7%	100.0%	No data available
Exterior Doors	62.1%^	±9.0%	100.0%	No data available
Overall	**64.8%**	**±1.9%**	**N/A**	**N/A**

^ Evaluation results are statistically different from the Con Edison placeholder (Con Edison placeholder is outside the precision bounds of the evaluation results).
* Evaluation results are statistically the same as the Con Edison placeholder (Con Edison placeholder is inside the precision bounds of the evaluation results).

Table 6 shows the space heating fuel saturation results from the study (bottom shaded row) and those from secondary research. The Con Edison placeholder was that 25% of space heating used electricity while the study provided an estimate of 9%, which is much lower, but well within the range of secondary research findings. The gas space heating saturation from the study was 69%. This compares to Con Edison's placeholder of 75% and falls near the middle of the saturation estimates gathered from other NY-based results.

Table 6. Space heating fuel saturation compared to Con Edison placeholder and secondary data

Source	Electric	Gas
NYSERDA 2019 Building Stock Assessment of SF Homes in Climate Zone 4 (covering NYC, Long Island, and Westchester County)	4%	67%
Based on 2019 energy consumption estimates for residential buildings in CECONY territory by fuel and by use case. EPRI. Assessment of building electrification technologies in New York State. 2023.	8%	63%
NYCPLUTO database HR&A analysis of Low-to-Moderate-Income (LMI) customers	11%	83%
NYCPLUTO database HR&A analysis of non-Low-to-Moderate-Income (non-LMI) customers	12%	82%
NYSERDA 2019 Building Stock Assessment. Combined value for NYC & Westchester County of occupied housing units by type of space heating fuel	12%	66%
Central Hudson (NY) ShopLocal – Retail (2018 Residential Appliance Saturation Survey)	12%	25%
2020 New York State RECS data/EIA website	16%	61%
Ameren (IL) Residential Program – Retail and Online (IL TRM)	18%	82%
Study Results from In-store Intercepts and Web Survey	**9%**	**69%**

Table 7 compares the DHW heating fuel saturation result from the web surveys to both Con Edison's placeholder and results from the secondary literature review. The study result for electric DHW heating is 14.0% with ±3.2% precision at the 90% confidence level, compared to Con Edison's placeholder of 25%. The study result for natural gas DHW heating is 69.5% with ±4.2% precision at the 90% confidence level, compared to Con Edison's placeholder of 75%. Electric DHW heating saturation rates from other NY-specific and non-NY sources were higher than the results of this study and the gas DHW heating saturation rates from these sources were generally lower.

Table 7. DHW heating fuel saturation compared to Con Edison placeholder and secondary data

DHW Fuel	Study Result	Con Edison Placeholder	Secondary Literature Review (# of sources)
Electric	14.0%^	25.0%	28%-31% NY-specific (2), 24-36% Non-NY (2)
Natural Gas	69.5%^	75.0%	27%-57% NY-specific (2), 55-76% Non-NY (2)

^ Evaluation results are statistically different from the Con Edison placeholder (Con Edison placeholder is outside the precision bounds of the evaluation results).

Conclusions

The Con Edison Retail Products Program demonstrated effective delivery of both electric and fossil fuel energy savings through its mid-stream, retail-based approach. Undertaken as a program to build off the successful retail partnership approach from its lighting program, the products examined in this study experienced varying installation rates that ranged from 34% to 86%, with most measures between 50% and 80%. One study take away was that in addition to installation rates driving achieved program savings, the space heating fuel saturations were particularly influential in driving program gas and electric savings achievements.

The dual-method primary data collection strategy proved effective for this evaluation. Both the intercept and web surveys contributed valuable insights into overall program performance and product-level impacts, while also allowing for a comparison of their respective strengths and limitations. Ultimately, the web survey emerged as the more reliable source for most impact needs. Its targeted design and execution were critical in generating dependable estimates of installation rates and fuel saturation for space heating and domestic hot water systems—key inputs for understanding program performance.

The rolling style evaluation approach provided key findings to Con Edison for ongoing refinements of savings parameters and a near real-time understanding of program. Other program administrators considering a pivot from lighting to a broader variety of product incentives at retailers may find the approaches taken to be instructive as they work to ensure savings estimates remain grounded in systematically gathered data.

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